



OPERATING SUMMARY

ELMIRA

water pollution control plant

1968

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Division of Plant Operations

#1

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1968**

Elmira : water pollution control
plant.

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Water management in Ontario

Ontario
Water Resources
Commission

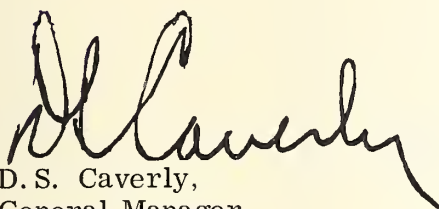
135 St. Clair Ave. W.
Toronto 7
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

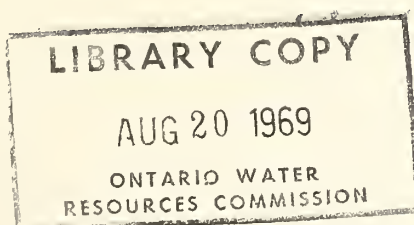
Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.


D. S. Caverly,
General Manager.


D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.





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ELMIRA

water pollution control plant

operated for

THE TOWN OF ELMIRA

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

CONTENTS

Title Page	i
Foreword	ii
'68 Review	1
Project Costs	2
Operating Costs	3
Process Data	5
Conclusions	Inside back cover

'68 REVIEW

The operating cost for the year was \$41,343.07, an increase of \$311.66 over the previous year. The unit cost for treating one million gallons increased from \$161.82 in 1967 to \$162.13 in 1968. A decrease in staff from four to three has kept these costs at a minimum.

In 1968 the plant treated an average flow of 0.697 mgd, 102.5% of the design capacity of 0.680 mgd. This design flow was exceeded 57% of the time during the year.

Reductions of 82% in BOD and 58% in suspended solids were experienced in 1968, compared to 83.5% and 62.5% respectively in 1967. The final effluent average BOD and suspended solids concentrations of 56 mg/l and 74 mg/l greatly exceeded the OWRC objectives of 15 ppm for both BOD and suspended solids. The average raw sewage strength was 310 mg/l for BOD and 182 mg/l for suspended solids.

PROJECT COSTS

NET CAPITAL COST (Final)		\$582,424.56
DEDUCT - Payments from Municipalities	\$100,085.00	
- Portion Financed by CMHC-MDLB (Final)	<u>388,449.01</u>	<u>488,534.01</u>
Long Term Debt to OWRC		\$ <u>93,890.55</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968		\$ <u>8,564.06</u>
Net Operating		\$ 41,343.07
Debt Retirement		1,895.00
Reserve		3,571.92
Interest Charged		<u>5,271.35</u>
TOTAL		\$ <u>52,081.34</u>

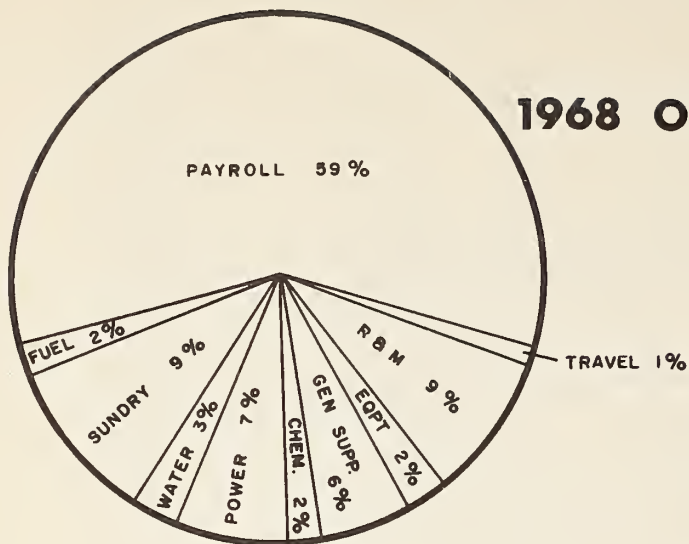
RESERVE ACCOUNT

Balance at January 1, 1968	\$ 6,473.74
Deposited by Municipality	3,571.92
Interest Earned	449.18
	<u>\$ 10,494.84</u>
Less Expenditures	<u>297.00</u>
Balance at December 31, 1968	\$ <u>10,197.84</u>

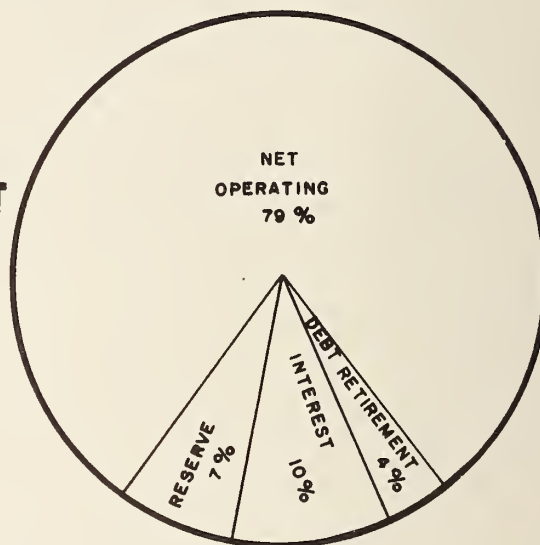
Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	2594.71	1832.95	-	133.93	254.87	-	66.04	15.12	-	52.50	186.40	52.90
FEB	3133.81	1817.19	-	126.93	287.69	-	251.52	39.87	291.67	284.78	-	34.16
MAR	4926.12	2901.11	-	161.13	260.06	61.01	256.86	283.79	252.37	600.53	136.38	12.88
APRIL	2507.85	1817.19	-	98.61	270.02	-	169.12	-	14.60	123.75	-	14.56
MAY	3165.45	1817.19	-	65.72	250.71	238.61	213.87	51.14	29.00	322.65	143.80	32.76
JUNE	2499.03	1688.28	-	32.83	214.77	-	214.42	52.09	-	259.40	-	37.24
JULY	2999.52	1362.10	-	8.10	205.42	-	223.33	369.81	135.06	397.35	196.39	101.96
AUG	3746.44	2079.67	756.14	7.12	223.08	-	24.80	47.86	331.37	233.00	-	43.40
SEPT	2960.71	1362.10	308.64	,28	206.45	238.61	276.67	-	95.10	252.15	206.71	14.00
OCT	3692.17	1414.04	-	12.13	213.73	-	213.17	118.31	1314.61	381.24	-	24.94
NOV	3588.12	1371.44	-	36.74	214.77	238.61	107.75	-	521.60	749.60	260.71	86.90
DEC	5529.14	3628.68	-	104.36	242.40	59.27	251.08	12.97	713.86	464.92	-	51.60
TOTAL	41343.07	23091.94	1064.78	787.88	2843.97	836.11	2268.63	990.96	3699.24	4121.87	1130.39	507.30

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$2,474.50



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1965	158.41	\$26,960.67	\$170.20	16 cents
1966	202.88	45,931.52	226.40	10 cents
1967	255.85	41,031.41	161.82	7 cents
1968	255.00	41,343.07	162.13	6 cents

Process Data

FLOWS

Flow data representing town sewage, industrial wastes from UniRoyal Limited, and combined wastes on monthly average and probability bases are shown in the accompanying graphs and tables.

The average daily flow from the Town decreased slightly from 0.548 mgd in 1967 to 0.542 mgd in 1968. The design flow of 0.5 mgd was exceeded 55% of the time.

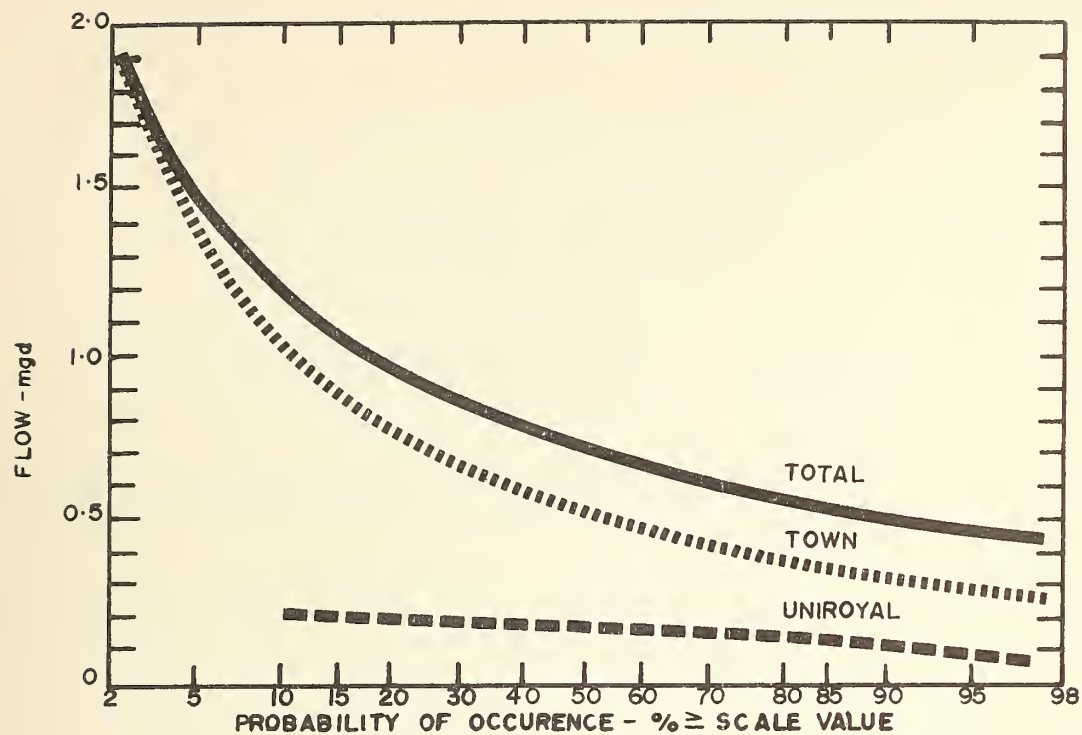
The average daily flow from UniRoyal increased from 0.146 mgd to 0.155 mgd. The design flow of 0.180 mgd was exceeded 40% of the time in 1968, the same percentage value that the design flow was exceeded in 1967.

PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED lbs	DOSAGE mg/l
JAN	17.04	.550	1.854	.377	1490	8.7
FEB	22.30	.769	3.161	.426	596	2.7
MAR	32.88	1.061	2.792	.326	481	1.5
APR	19.98	.666	1.360	.430	403	2.0
MAY	18.11	.584	1.200	.425	485	2.7
JUN	18.31	.610	2.180	.450	458	2.5
JUL	15.74	.508	2.170	.200	478	3.0
AUG	18.22	.588	1.500	.150	360	2.4
SEPT	24.26	.809	1.380	.350	467	1.9
OCT	26.34	.850	1.400	.635	459	1.7
NOV	20.42	.681	1.180	.440	470	2.3
DEC	21.40	.690	1.020	.185	472	2.2
TOTAL	255.00	-	-	-	6619	-
AVERAGE	-	.697	-	-	552	2.6

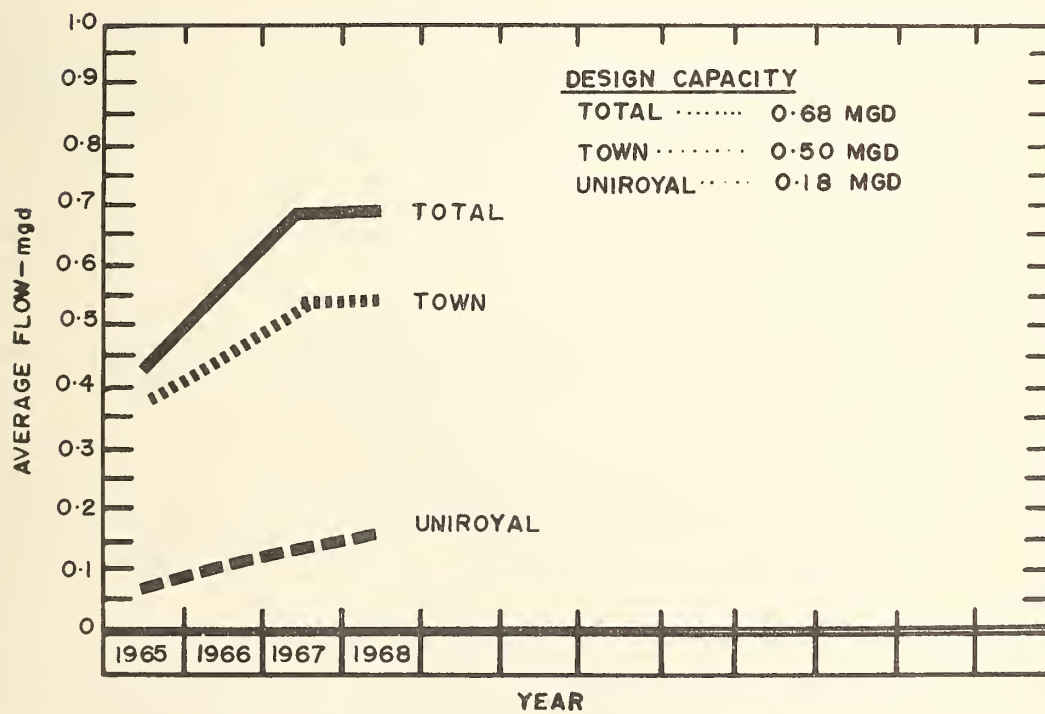
COMMENTS

A total of 6,619 pounds of chlorine was required to chlorinate the final effluent during the year. The average dosage rate to maintain a chlorine residual of 0.5 mg/l for a contact period of 15 minutes was 2.6 mg/l.



FL O W S

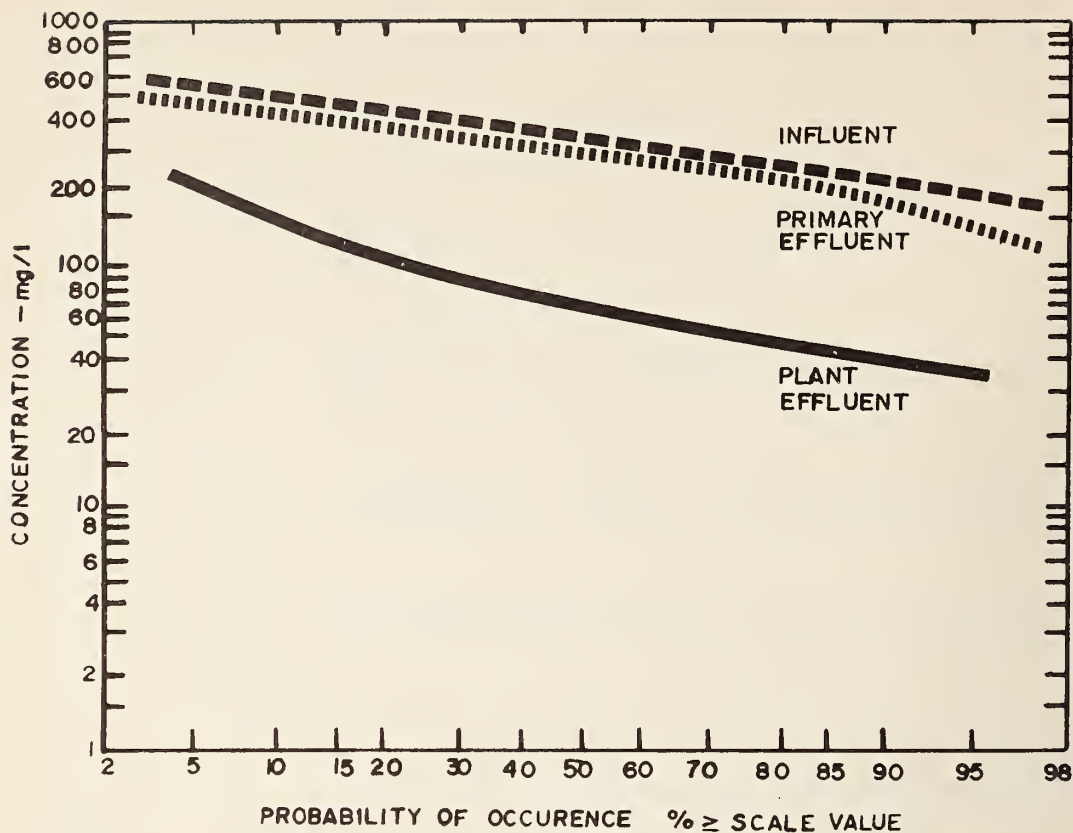
(COMBINED)



OPERATING SUMMARY

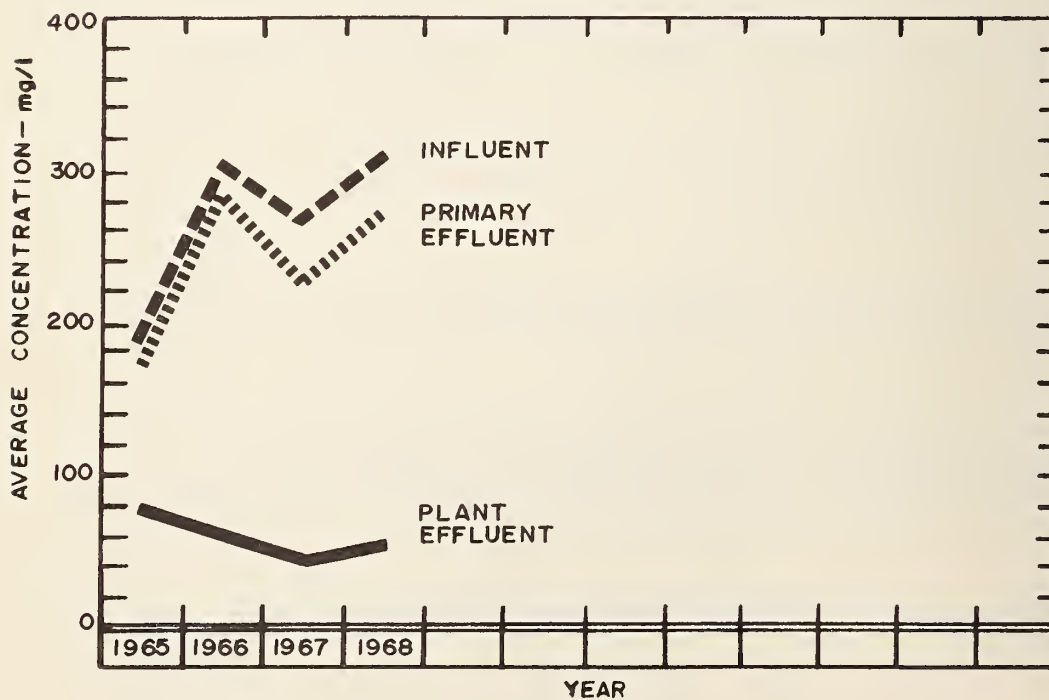
Week Ending	UNIROYAL				TOWN			COMBINED				
	Flow MG	BOD	SS	Flow MG	BOD	SS	Flow MG	Raw		SS	Final	
								Flow MG	BOD		BOD	SS
Jan. 6	.895	1035	47	2.159	95	180	3.054	515		231	54	83
13	.923	605	101	2.158	162	581	3.081	260		179	55	147
20	1.250	790	83	2.553	148	158	3.803	240		83	66	93
27	1.298	543	54	2.301	86	153	3.599	332		147	58	94
Feb. 3	1.194	763	48	8.049	89	138	9.243	257		162	54	80
10	1.268	637	84	5.188	98	141	6.456	280		112	47	58
17	1.191	633	110	2.978	180	175	4.169	376		127	156	93
24	1.165	528	104	2.487	203	288	3.652	338		239	159	131
Mar. 2	.823	675	86	2.282	167	199	3.105	310		152	152	129
9	.835	950	97	4.409	202	235	5.244	490		214	143	135
16	.800	633	68	7.311	137	144	8.111	268		117	66	74
23	.640	593	41	5.485	118	141	6.125	192		111	62	50
30	.760	673	51	10.811	84	98	11.571	235		96	40	58
Apr. 6	.875	1133	41	6.392	141	165	7.267	288		103	52	112
13	1.000	870	40	3.719	180	248	4.719	285		138	48	106
20	.970	625	261	2.465	106	144	3.435	185		147	53	96
27	1.065	663	90	2.748	121	199	3.813	263		219	33	99
May 4	1.070	660	129	3.000	169	235	4.070	278		183	57	126
11	1.380	553	37	2.400	153	210	3.780	237		130	57	152
18	1.385	510	119	3.450	351	222	4.835	290		159	70	75
25	1.170	527	39	2.800	163	225	3.970	275		136	29	68
June 1	.875	450	54	2.850	135	236	3.725	211		181	23	74
8	1.135	373	128	2.450	410	192	3.585	365		206	26	62
15	1.260	742	61	2.500	213	208	3.760	355		247	26	46
22	1.260	980	56	2.700	280	266	3.960	440		188	32	71
29	1.230	760	133	4.800	180	374	6.030	270		402	72	66

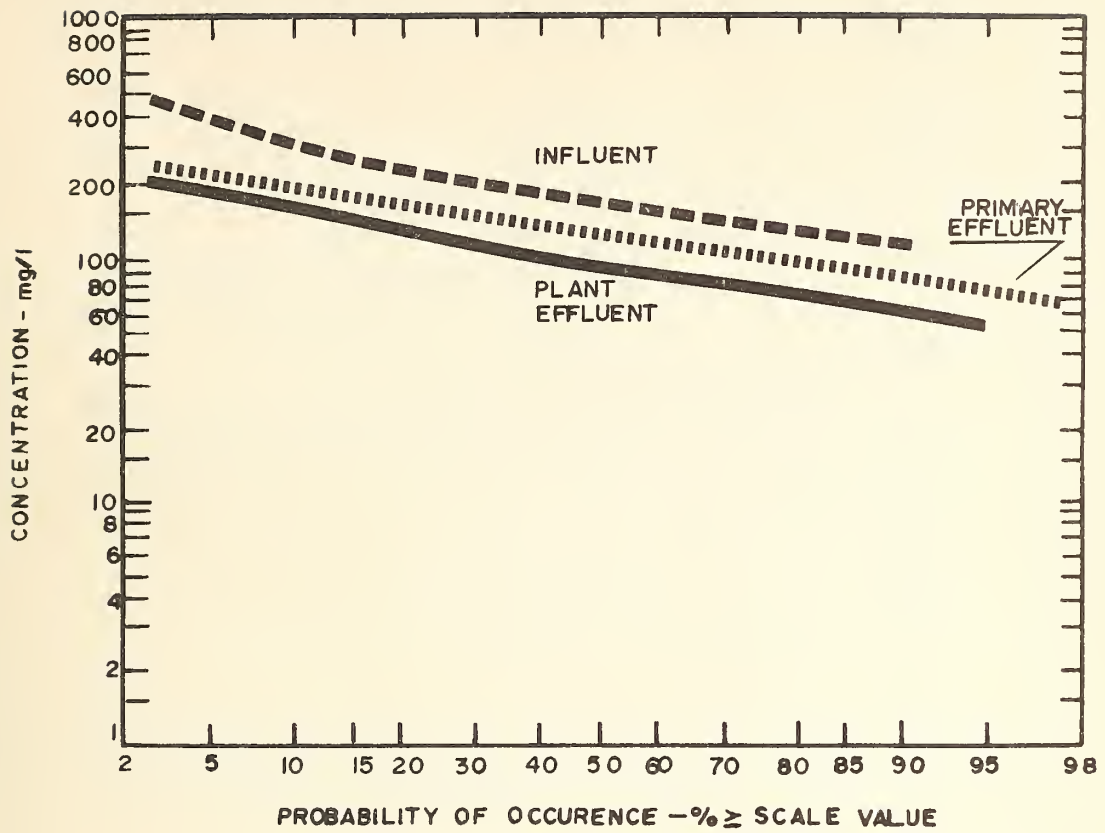
July	6	1.050	420	65	2.300	135	162	3.350	280	145	12	30
	13	1.200	300	176	3.950	70	55	5.150	110	61	12	53
	20	1.260	380	54	2.000	152	106	3.260	310	63	45	36
	27	1.260	550	61	1.950	140	79	3.210	220	75	19	21
Aug.	3	0.625	440	231	1.300	480	358	1.925	195	74	22	39
	10	0.400	350	162	5.700	6	25	6.100	11	11	5	39
	17	0.900	310	278	4.200	110	54	5.100	88	79	32	69
	24	1.050	1120	64	2.550	145	139	3.600	280	128	34	49
	31	1.050	1080	149	1.675	110	113	2.725	280	139	38	50
Sept.	7	0.905	860	82	4.800	125	107	5.705	220	267	26	27
	14	1.210	1100	285	5.470	95	53	6.680	190	88	17	43
	21	1.260	800	278	3.500	170	250	4.760	250	186	24	27
	28	1.260	900	64	4.500	90	99	5.760	410	202	50	95
Oct.	5	1.280	660	35	4.900	160	139	6.180	310	145	61	80
	12	1.400	1280	152	5.300	118	114	6.700	310	89	104	51
	19	1.280	980	654	4.200	170	238	5.480	520	194	86	184
	26	1.260	1280	108	4.700	170	166	5.960	185	177	52	45
Nov.	2	.605	625	48	4.050	177	253	4.655	132	123	27	31
	9	.880	800	42	2.900	200	243	3.780	315	165	22	29
	16	1.240	780	42	3.470	235	179	4.710	370	128	86	78
	23	1.265	1180	54	3.600	145	144	4.865	280	120	84	59
	30	1.235	1400	69	4.550	110	83	5.785	400	83	120	45
Dec.	7	1.015	750	51	4.850	120	129	5.865	150	122	40	62
	14	1.240	1200	170	4.300	350	170	5.540	360	100	70	70
	21	1.250	850	40	3.325	160	80	4.575	350	80	70	80
	28	1.220	-	-	3.165	-	-	4.385	-	-	-	-
	31	.375	-	-	.660	-	-	1.035	-	-	-	-
Total		56.692	751	109	198.310	163	178	255.002	282	146	56	74
Average												



BIOCHEMICAL OXYGEN DEMAND

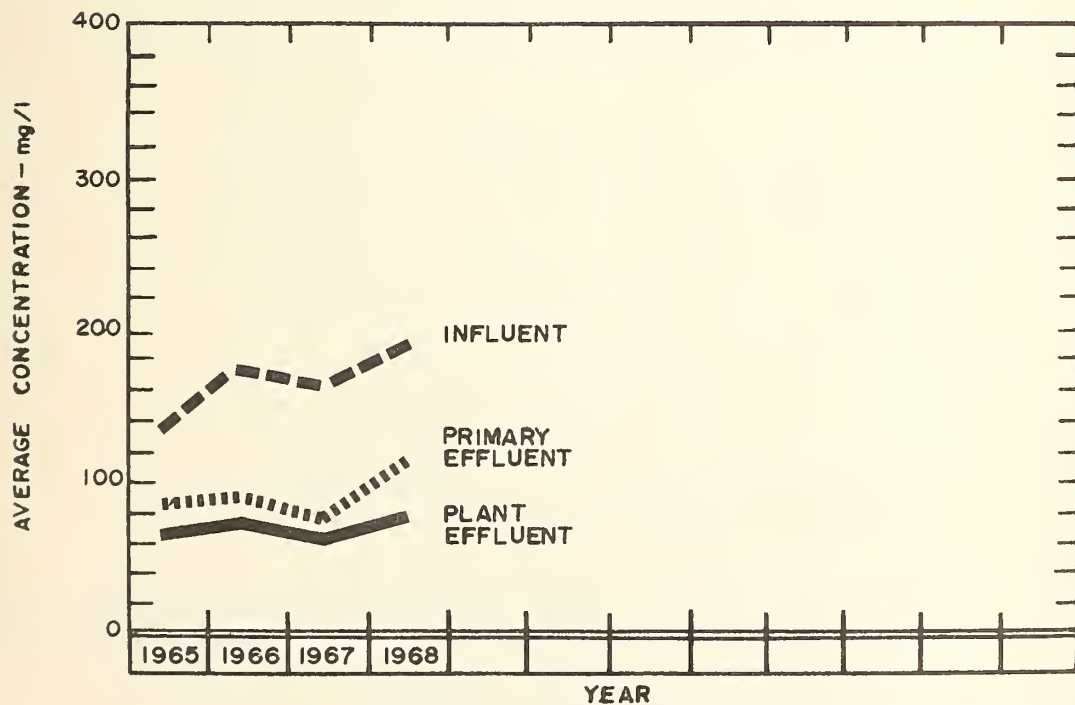
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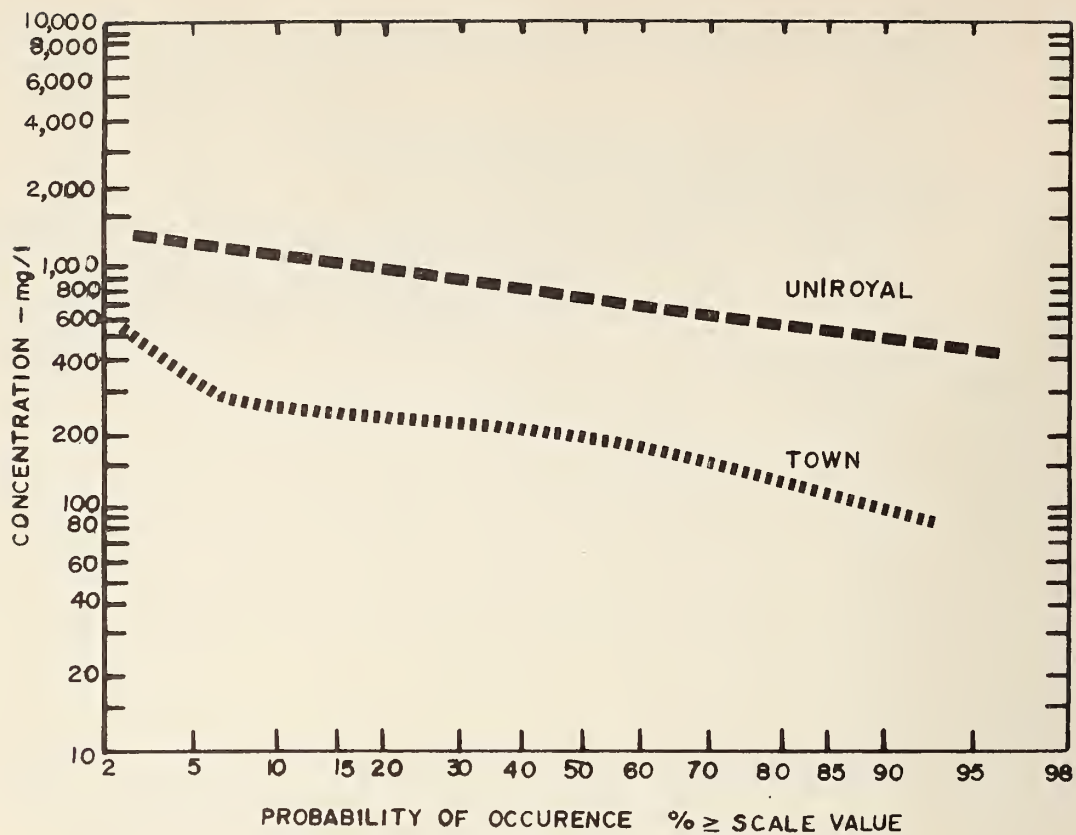




SUSPENDED SOLIDS

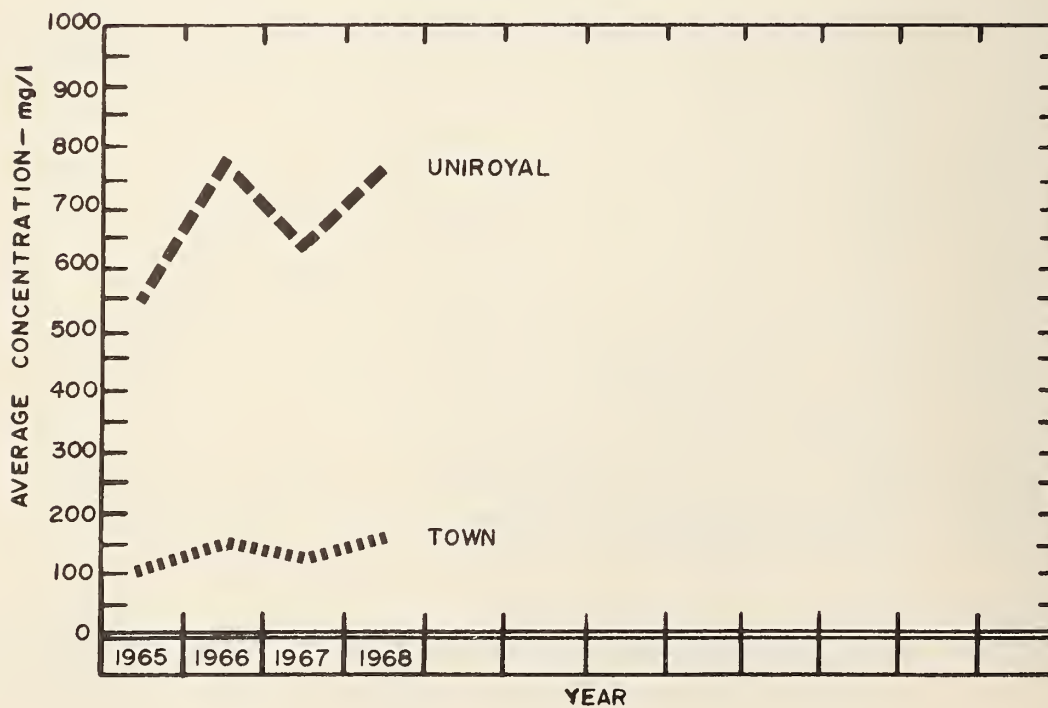
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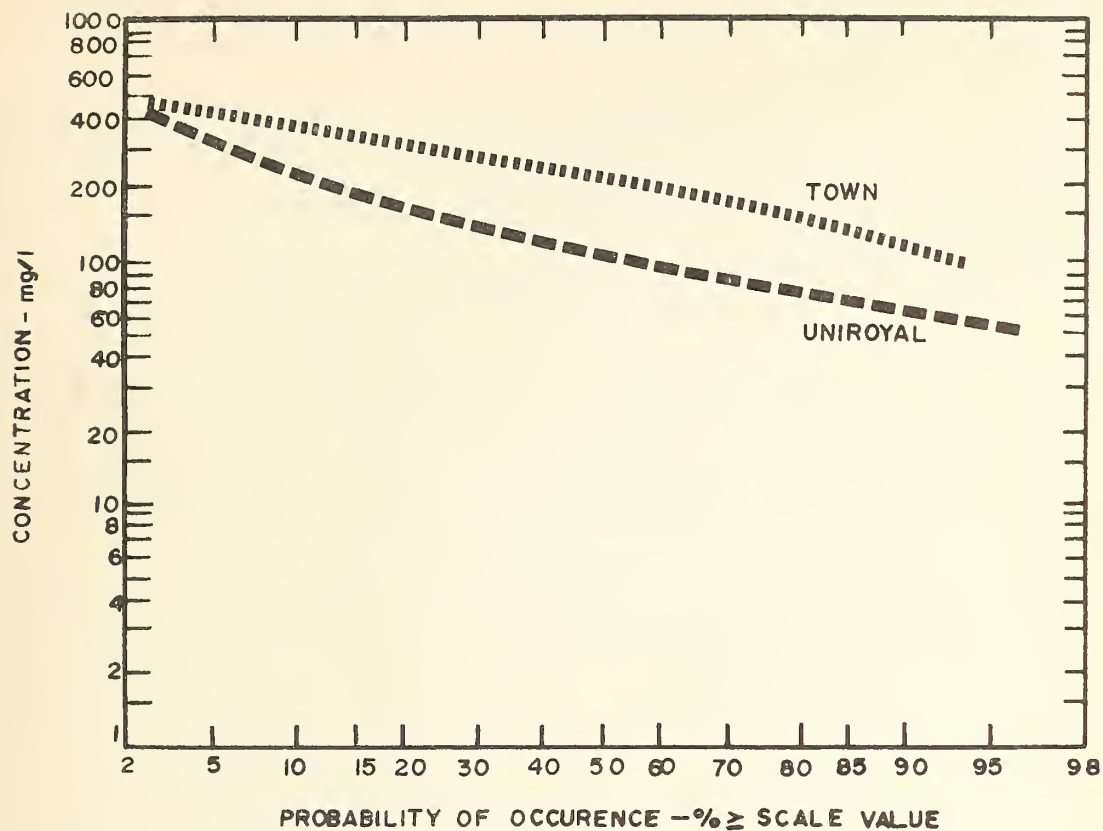




BIOCHEMICAL OXYGEN DEMAND

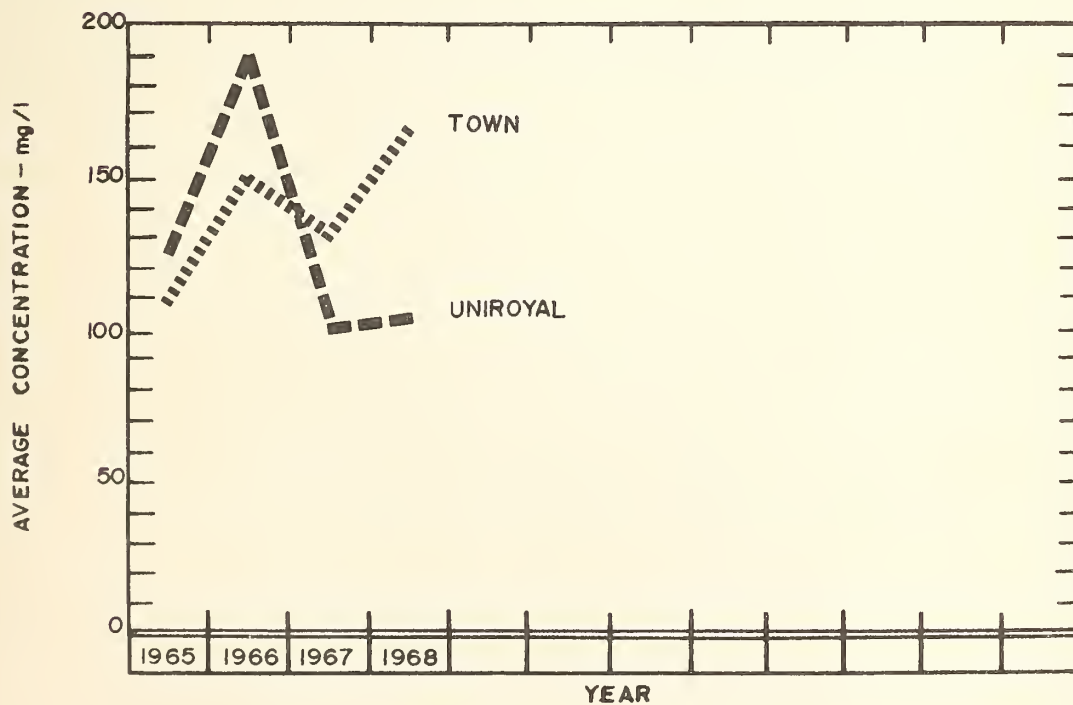
(UNIROYAL & TOWN)





SUSPENDED SOLIDS

(UNIROYAL & TOWN)



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ³ lb	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ³ lb	REMOVAL ft ³
JAN	325	59	82	45.3	165	92	44	12.4	-
FEB	317	121	62	43.7	160	96	40	14.3	-
MAR	296	82	72	70.4	138	84	39	17.8	-
APR	270	45	83	44.9	160	106	34	10.8	-
MAY	250	43	83	37.5	153	97	37	10.2	-
JUN	715	32	96	125.1	498	111	78	70.9	-
JULY	230	22	90	32.8	86	35	59	8.0	-
AUG	171	26	85	26.4	86	49	43	6.7	-
SEPT	267	29	89	57.8	371	48	87	78.3	-
OCT	301	65	78	62.2	147	78	47	18.2	-
NOV	290	69	76	45.1	123	48	61	15.3	-
DEC	287	60	79	48.6	101	71	30	6.4	-
TOTAL	-	-	-	639.8	-	-	-	269.3	-
AVERAGE	310	55	82	53.3	182	76	58	22.4	-

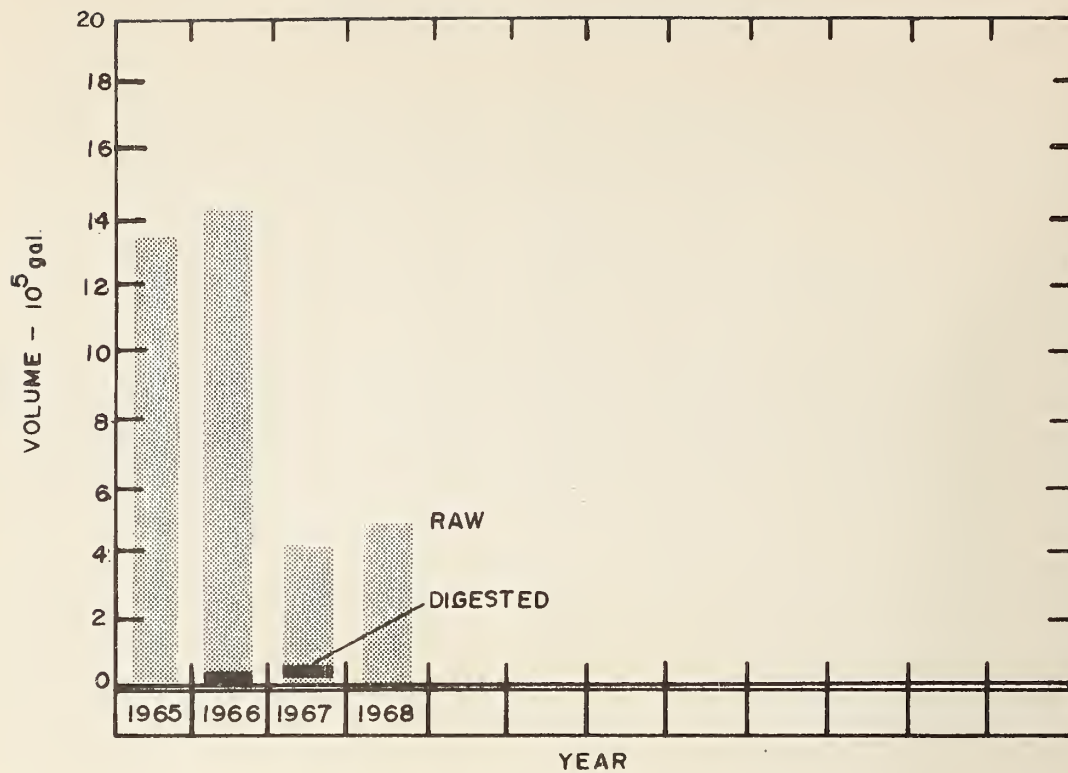
COMMENTS

The average BOD concentration of the Town's sewage was 163 mg/l, an increase of 33 mg/l over the previous year. The BOD design concentration of 170 mg/l was exceeded 63% of the time. The average suspended solids concentration of the Town sewage was 178 mg/l, representing an increase in concentration of 4mg/l over the previous year. The design concentration for suspended solids of 300 mg/l was exceeded only 18% of the time.

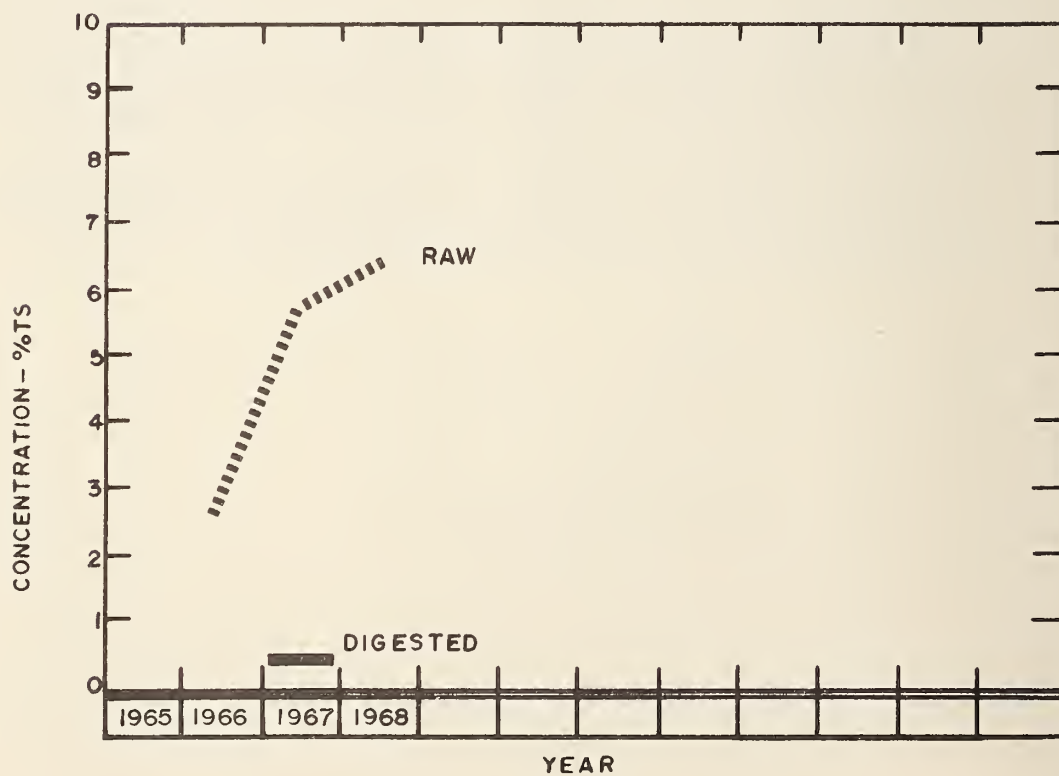
The average BOD concentration from UniRoyal of 757 mg/l represented an increased loading of 18.5% over the previous year. The design concentration of 1100 mg/l was exceeded only 10% of the time. The average suspended solids concentration in UniRoyal's wastes was 109 mg/l representing an increase of 10.1% in suspended solids concentrations over the previous year. The design concentration for suspended solids of 320 mg/l was exceeded only 3% of the time.

The average BOD concentration of the combined influent of 282 mg/l was 67.2% of the design concentration of 420 mg/l. The average BOD concentration in 1967 represented 63.5% of the design concentration. The design BOD concentration was exceeded 15.0% of the time. The average suspended solids concentration of the combined influent of 146 mg/l represents 47.7% of the design concentration. The design suspended solids concentration of 306 mg/l was exceeded approximately 7.2% of the time.

The average plant effluent BOD and suspended solids concentrations were respectively 56 mg/l and 74 mg/l during the year. The OWRC objective of 15 mg/l was not met at any time during the year.



DIGESTION



SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10 ³ gal	T. S. %	V. S. %	VOLUME gal	T. S. %	V. S. %	VOLUME gal	T. S. %	LIQUID yd ³	DEWATERED yd ³
JAN	3.90	4.9	63	-	-	-	-	-	231	0
FEB	27.7	4.4	69	-	-	-	-	-	164	0
MAR	24.0	5.6	56	-	-	-	-	-	142	0
APR	34.2	4.9	60	-	-	-	-	-	203	0
MAY	44.6	4.8	59	-	-	-	-	-	265	0
JUN	51.6	7.1	73	-	-	-	-	-	306	0
JUL	30.0	7.2	69	-	-	-	-	-	178	0
AUG	37.6	7.4	62	-	-	-	-	-	223	0
SEPT	59.1	7.7	59	-	-	-	-	-	350	0
OCT	39.3	8.0	69	-	-	-	-	-	233	0
NOV	42.5	8.4	67	-	-	-	-	-	252	0
DEC	29.4	6.1	65	-	-	-	-	-	174	0
TOTAL	459.0	-	-	-	-	-	-	-	2721	0
AVERAGE	38.3	6.4	64	-	-	-	-	-	227	0

COMMENTS

The digester operation was suspended in March 1967 because of un-treatable raw sludge. The digester has been out of operation since that time.

AERATION

MONTH	AVERAGE FLOW mgd	PRIMARY EFF		SECONDARY EFF		MLSS CONC ^N mg/l	F/M $\left(\frac{\text{lb BOD}}{\text{lb MLSS}}\right)$	AIR USED $\left(\frac{1000 \text{ ft}^3}{\text{lb BOD}}\right)$ REMOVED	WASTE SLUDGE lb
		BOD CONC ^N mg/l	SS CONC ^N mg/l	BOD CONC ^N mg/l	SS CONC ^N mg/l				
JAN	.550	317	95	59	92	6,330	.09	-	-
FEB	.769	271	93	121	96	5,330	.13	-	-
MAR	1.061	200	85	82	84	5,450	.13	-	-
APRIL	.666	235	96	45	106	5,890	.09	-	-
MAY	.584	214	107	43	97	5,080	.08	-	-
JUN	.610	327	96	32	111	3,460	.19	-	-
JUL	.508	201	161	22	35	3,200	.11	-	-
AUG	.588	194	60	26	49	3,310	.12	-	-
SEPT	.809	243	100	29	48	3,450	.19	-	-
OCT	.850	323	162	65	78	3,450	.27	-	-
NOV	.681	332	120	69	48	3,210	.24	-	-
DEC	.690	353	143	60	71	2,770	.30	-	-
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	.697	267	110	55	76	4,240	.16	-	-

COMMENTS

Difficulty was experienced throughout the year in maintaining a healthy activated sludge in the aeration section. The problem has been attributed directly to toxic wastes from UniRoyal Limited.

LABORATORY LIBRARY



96936000118639

CONCLUSIONS

The plant was unable to meet OWRC objectives for final effluent quality. The poor treatment is attributed directly to toxic industrial wastes from UniRoyal Limited.

The average daily flows were slightly greater than the design capacity of 0.680 mgd.

Date Due

TD/227/E55/W38/1968/MOE
Ontario Water Resources Co
Elmira water
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